

Mathematics

Standard: The adult learner develops and applies math strategies to a variety of situations.

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Standard: The adult learner develops and applies math strategies to a variety of situations.

Pre-Literacy

Indicator A: Develops and applies number sense to solve a variety of real-life problems and to determine if the results are reasonable

1. Recognizes relationships between real-life representations, number names, and symbolic representation of numbers
 - a. Writes and reads whole numbers between 0 and 100 as numerals
2. Relates counting, grouping, and place value concepts to whole numbers
 - a. Places in correct sequence whole numbers between 0 and 100
3. Performs the operations of addition and subtraction of one-digit numbers
 - a. Adds and subtracts whole numbers between 0 and 9 correctly
4. Uses coins and currency
 - a. Recognizes symbols for currency (e.g., \$, ¢)
 - b. Identifies coins and currency using pennies, nickels, dimes, quarters, half-dollars, and bills

Indicator B: Applies data collection, data analysis, and probability to interpret, predict, and/or solve real-life problems

1. Constructs and reads tables, charts and graphs
 - a. Collects and records data from a simple survey of at least 5 respondents
 - b. Organizes data according to choice from a simple survey of at least 5 respondents
 - c. Identifies choice receiving largest and smallest number of responses from a simple survey of at least 5 respondents
 - d. Constructs a display of data indicating responses from a simple survey of at least 5 respondents

Indicator C: Applies algebraic concepts and methods to explore, analyze or solve real-life problems

1. Creates, describes, and extends a variety of patterns and formulates generalizations to make predictions
 - a. Replicates a pattern using manipulatives or objects (tangrams)
2. Represents and describes mathematical ordering and grouping relationships
 - a. Determines the next number in a sequence of numbers up to a hundred

Indicator D: Uses geometric properties, relationships, and methods to identify, analyze and solve real-life problems

1. Identifies basic geometric shapes
 - a. Names simple polygons (e.g., triangle, square, rectangle)
 - b. Names simple solid geometric forms using own vocabulary

Indicator E: Applies knowledge of standard measurements to real-life situations

1. Selects the appropriate measurement with U.S. customary units for an object or event
 - a. Selects the appropriate device to measure the given attribute of an object or event (e.g., ruler, thermometer, measuring cup, scale, stop watch)

ABE I

Indicator A: Develops and applies number sense to solve a variety of real-life problems and to determine if the results are reasonable

1. Demonstrates an understanding of number meanings and relationships
 - a. Places numbers between 0 and 1000 on a number line
 - b. Describes fractions (halves, thirds, fourths) as parts of a whole
 - c. Distinguishes between odd and even numbers
2. Recognizes relationships between real-life representations, number names, and symbolic representation of numbers
 - a. Expresses and reads whole numbers between 0 and 1000 as numerals
 - b. Reads and writes whole numbers between 0 and 1000 as number words
 - c. Matches a fraction to a pictorial representation of halves, thirds, and fourths
 - d. Matches a number word to a pictorial representation of halves, thirds, and fourths
3. Represents and uses numbers in equivalent forms
 - a. Writes whole numbers between 0 and 1000 in expanded notation (e.g., $89 = 80 + 9$)
 - b. Makes a model to represent a fractional representation of halves, thirds and fourths
4. Uses coins and currency
 - a. Expresses equal relationships of coins and currency using pennies, nickels, dimes, quarters, half-dollars, and bills up to \$5.00
5. Demonstrates the meaning of operations and the relationships between them
 - a. Explains that addition joins groups
 - b. Explains that subtraction decreases, takes away, compares, or finds the difference
 - c. Uses addition to check subtraction problems and vice versa
6. Performs the operations of addition, subtraction, multiplication, and division on whole numbers
 - a. Adds, subtracts up to 500, multiplies, and divides single digit whole numbers correctly
 - b. Selects appropriate operation in addition or subtraction to solve one-step word problems involving whole numbers up to 500.
 - c. Selects appropriate operation in multiplication and division to solve one-step word problems with single digit numbers
7. Selects and uses appropriate techniques to facilitate computation while solving problems and determining the reasonableness of results
 - a. Rounds whole numbers to tens and hundreds
 - b. Uses estimation to check the reasonableness of results in solving one-step word problems in addition and subtraction of whole numbers up to 500
 - c. Uses estimation to check the reasonableness of results in solving one-step word problems in multiplication and division of single-digit numbers

Indicator B: Applies data collection, data analysis, and probability to interpret, predict, and/or solve real-life problems

1. Constructs, reads, analyzes, and interprets tables, charts, and graphs
 - a. Makes and labels a graph (horizontal bar, vertical bar, circle graph, pictograph) from data
2. Predicts and measures the likelihood of events
 - a. Collects and records data from a simple one-step probability experiment
 - b. Organizes (e.g., sorts, sequences, tallies data from a simple one-step probability experiment)
 - c. Predicts the possible outcomes from a simple one-step probability experiment
 - d. Predicts the most likely or least likely outcome in a simple one-step probability experiment
 - e. Compares the outcome of the experiment to the prediction

Indicator C: Applies algebraic concepts and methods to explore, analyze or solve real-life problems

1. Creates, describes, and extends a variety of patterns and formulates generalizations to make predictions
 - a. Communicates orally the description of the pattern in a series of objects
 - b. Communicates orally a description of the pattern in a sequence of numbers
 - c. Extends a pattern using manipulatives or objects
 - d. Extends a pattern occurring in a sequence of numbers
2. Represents and describes mathematical ordering and grouping relationships
 - a. Identifies the pattern in skip counting (e.g., 2, 4, 6 – add 2 to each number)
 - b. Determines the next number in a skip counting pattern (e.g., 2, 4, 6 _____?)

Indicator D: Uses geometric properties, relationships, and methods to identify, analyze and solve real-life problems

1. Identifies and describes basic geometric shapes
 - a. Identifies the characteristics of simple polygons (e.g., triangle, square, rectangle)
 - b. Identifies the characteristics of simple solid geometric figures (e.g., cube and rectangular container)

Indicator E: Applies knowledge of standard measurements to real-life situations

1. Demonstrates that a single object or event can be measured in different ways (e.g., length, mass/weight, time, capacity, temperature, area, volume)
 - a. Determines what attributes of an object or event are measurable
 - b. Identifies the appropriate type of measurement for each attribute of an object or event

2. Identifies the appropriate measurement with U.S. customary units for an object or event including:
 - a. Length - inches, feet and yards
 - b. Capacity - cups, gallons
 - c. Weight - ounces, pounds, tons
 - d. Area - square unit
 - e. Volume - cubic unit
 - f. Time - second, minute, hour, day, month, year, decade, century
 - g. Temperature - degrees on Fahrenheit scale, degrees on Celsius scale
3. Compares units of measurement to determine equal relationships using U.S. customary units (e.g., 2 cups = 1 pint, 3 cups > 1 pint)
4. Makes estimation of measurement
 - a. Using U.S. customary units, estimates a measurement of a given object or event and compares the estimation to actual measurement
 - b. Evaluates the reasonableness of the estimation
5. Applies measurement
 - a. Solves real-life problems involving measurements using U.S. customary units

ABE II

Indicator A: Develops and applies number sense to solve a variety of real-life problems and to determine if the results are reasonable

1. Demonstrates an understanding of number meanings and relationships
 - a. Places numbers between 0 and 10,000 on a number line
 - b. Describes mixed numbers as parts of a whole
2. Recognizes relationships between real-life representations, number names, and symbolic representation of numbers.
 - a. Expresses and reads whole numbers between 0 and 10,000 as numerals
 - b. Reads and writes whole numbers between 0 and 10,000 as number words
 - c. Matches a mixed number to a pictorial representation
 - d. Matches a number word to a pictorial representation of mixed numbers
3. Represents and uses numbers in equivalent forms
 - a. Writes whole numbers between 0 and 10,000 in expanded notation (e.g., $89 = 80 + 9$)
 - b. Makes a model to represent a fractional representation of mixed numbers
4. Uses coins and currency
 - a. Expresses equal relationships of coins and currency using pennies, nickels, dimes, quarters, half-dollars, and bills up to \$100.00
5. Demonstrates the meaning of operations and the relationships between them
 - a. Explains that multiplication is repeated addition of equal numbers and/or groups
 - b. Explains that division is repeated subtraction or placing items into groups of equal size
 - c. Uses multiplication to check division problems and vice versa
6. Performs the operations of addition, subtraction, multiplication, and division on whole numbers
 - a. Adds, subtracts, multiplies, and divides whole numbers between 0 and 1,000 correctly
 - b. Selects appropriate operation to solve one-step word problems involving whole numbers between 0 and 1,000
7. Selects and uses appropriate techniques to facilitate computation while solving problems and determining the reasonableness of results
 - a. Rounds whole numbers to thousands
 - b. Uses estimation to check the reasonableness of results in solving one-step word problems using whole numbers between 0 and 1,000

Indicator B: Applies data collection, data analysis, and probability to interpret, predict, and/or solve real-life problems

1. Constructs, reads, analyzes, and interprets tables, charts, and graphs
 - a. Interprets and analyzes data from pictographs and bar graphs where each symbol represents one unit
 - b. Interprets and analyzes data on a pictograph where each symbol represents multiple units
2. Predicts and measures the likelihood of events
 - a. Describes events that have 100% probability or 0% probability
 - b. Identifies outcomes that are more likely, less likely, or equally likely to occur
 - c. Describes the concept of sample

Indicator C: Applies algebraic concepts and methods to explore, analyze or solve real-life problems

1. Creates, describes, and extends a variety of patterns and formulates generalizations to make predictions
 - a. Communicates in written form the description of the pattern in a series of objects
 - b. Communicates in written form a description of the pattern in a sequence of numbers
 - c. Extends simple geometric and number pattern
 - d. Creates simple geometric and number patterns
2. Represents and describes mathematical ordering and grouping relationships
 - a. Sorts and classifies objects according to observable attributes
 - b. Finds the missing element in a number sentence involving addition, subtraction, multiplication, and division
 - c. Uses words such as *all*, *none*, *some*, and *many* to make reasonable statements
 - d. Describes a rule for a simple pattern

Indicator D: Uses geometric properties, relationships, and methods to identify, analyze and solve real-life problems

1. Identifies and describes basic geometric shapes
 - a. Compares and contrasts the characteristics of simple polygons (e.g., triangle, square, rectangle)
 - b. Compares and contrasts the characteristics of simple solid geometric figures (e.g., cube and rectangular container)
 - c. Identifies characteristics of lines which intersect, are parallel, or are perpendicular

Indicator E: Applies knowledge of standard measurements to real-life situations

1. Demonstrates that a single object or event can be measured in different ways (e.g., length, mass/weight, time, capacity, temperature, area, volume)
 - a. Identifies the appropriate type of measurement for each attribute of an object or event and justifies answer
2. Demonstrates the appropriate measurement with U.S. customary and metric units for an object or event including:
 - a. Length - inches, feet and yards, millimeters, centimeters, meters, kilometers
 - b. Capacity - cups, gallons, milliliters, liters
 - c. Weight - ounces, pounds, tons, grams, kilograms
 - d. Area - square unit
 - e. Volume - cubic unit
 - f. Time - second, minute, hour, day, month, year, decade, century
 - g. Temperature - degrees on Fahrenheit scale, degrees on Celsius scale
3. Compares units of measurement to determine more or less relationships using U.S. customary and metric units (e.g., 2 cups = 1 pint, 3 cups > 1 pint)
4. Makes estimation of measurement
 - a. Using U.S. customary or metric units, estimates a measurement of a given object or event and compares the estimation to actual measurement and justifies the answer
 - b. Evaluates the reasonableness of the estimation and justifies the answer
5. Applies measurement
 - a. Solves real-life problems involving measurements using U.S. customary and metric units

ABE III

Indicator A: Develops and applies number sense to solve a variety of real-life problems and to determine if the results are reasonable

1. Develops concepts, number sense, and number relationships relating to whole numbers, fractions, decimals, and percents
 - a. Describes a fraction of any quantity as the relationship between the given numerator part(s) related to the entire number of part(s) in the whole denominator
 - b. Describes a decimal as the fractional representation of the quantity expressed as a whole number and/or tenths, hundredths, thousandths, etc.
 - c. Describes percents as a fraction or as parts out of 100
 - d. Reads and writes fractions, decimals, and percents as numerals and number words
 - e. Expresses and reads whole numbers between 1000 and 1,000,000,000 as numerals
 - f. Reads and writes whole numbers between 1000 and 1,000,000,000 as number words
 - g. Writes whole numbers between 1000 and 1,000,000,000 in expanded notation
 - h. Places in correct sequence whole numbers between 1000 and 1,000,000,000
 - i. Places in correct sequence fractions, decimals, and percents in same groups or mixed groups
 - j. Expresses a quantity in equivalent fraction, decimal, and percent form
2. Performs the operations of addition, subtraction, multiplication, and division using whole numbers, fractions, decimals, and percents
 - a. Selects and uses correctly the operations of addition, subtraction, multiplication, and division in story problems involving whole numbers
 - b. Selects and uses correctly the operations of addition, subtraction, multiplication, and division in story problems involving fractions and decimals
 - c. Identifies the whole, part, and percent in problems involving percent
 - d. Solves word problems involving averaging of rational whole numbers, fractions, or decimals
 - e. Solves word problems involving the order of operations
3. Applies number theory concepts to represent numbers in various ways
 - a. States the prime factors for a given whole number
 - b. Names the square root of a number with a perfect square
 - c. States the multiples of a given number
 - d. Defines prime and composite numbers
 - e. Sorts numbers by their properties
4. Selects and uses appropriate techniques and information to facilitate computation while solving problems and determining the reasonableness of results
 - a. Rounds decimals to tenths, hundredths, and thousandths place
 - b. Rounds fractions to nearest whole and/or half
 - c. Uses estimation to check the reasonableness of results using whole numbers, fractions, decimals, and percents in solving problems
 - d. Distinguishes between relevant and irrelevant information
 - e. Recognizes the degree of precision needed

Indicator B: Applies data collection, data analysis, and probability to interpret, predict, and/or solve real-life problems

1. Constructs, reads, analyzes and interprets graphs, tables, and charts
 - a. Interprets and analyzes data from circle and line graphs
 - b. Formulates questions from graphs, tables, and charts
 - c. Solves word problems using graphs, tables, and charts
2. Determines probabilities through experiments and/or simulations and compares the results with prediction
 - a. Predicts possible outcomes in an experiment in which the possible number of outcomes changes (e. g., two-step probability)
 - b. Compares the outcome of the experiment to the predictions

Indicator C: Applies algebraic concepts and methods to explore, analyze or solve real-life problems

1. Translates and differentiates the language of algebra
 - a. Describes and uses a variable and a constant in a real life situation
 - b. Defines a term, expression, equation and inequality
 - c. Simplifies an expression by combining like terms (e.g., $3x + 2 + 2x + 3 = 5x + 5$)
 - d. Translates a written phrase into an expression
 - e. Correctly uses mathematical symbols $<$, $>$, $=$, \neq
2. Identifies order of operations
 - a. Uses the correct order of operations in solving algebraic expressions
3. Represents and describes how changing the value of one variable in a relationship results in a change in another ("When I am 9, 3 times my age = 27. When I am 10, 3 times my age = 30. In the equation $3x = y$, when $x = 9$, $y = 27$ ")

Indicator D: Uses geometric properties, relationships, and methods to identify, analyze and solve real-life problems

1. Identifies, describes and measures basic geometric shapes and angles using definitions and appropriate measuring devices (e.g., protractor, ruler, compass)
 - a. Draws, measures, and classifies angles as right, acute, obtuse, straight, or reflex
 - b. Identifies the properties of geometric figures using definitions of similarity, congruent, and symmetry
 - c. Identifies and describes properties of alternate interior, corresponding, complementary, and supplementary angles
 - d. Classifies triangles by their angles and sides as equilateral, isosceles, scalene, acute, obtuse and right
 - e. Labels and identifies the characteristics of a circle, cylinder, parallelogram, pentagon, hexagon, octagon, decagon, rhombus, and trapezoid (e.g., radius, diameter, base, height)

Indicator E: Applies knowledge of standard measurements to real-life situations

1. Estimates and uses U.S. customary and metric measurement to describe and make comparison
 - a. Converts measurement units to equivalent units within a given system
 - b. Compares estimated measurements between U.S. customary and metric systems and Fahrenheit and Celsius systems
2. Estimates, uses, and describes measures of distance, perimeter, area, volume, capacity, weight, mass, and angles
 - a. Differentiates between perimeter, area, and volume of polygons and solids using concrete and illustrative modes
 - b. Differentiates between weight and mass
 - c. Differentiates between capacity and volume
 - d. Records estimates and measurements for:
 - Distance in scale drawings
 - Circumference
 - Degrees of angles
3. Uses formulas and procedures to solve problems involving measurement
 - a. Uses given formulas to find:
 - Area and perimeter of simple polygons
 - Surface area of rectangular containers
 - Volume of rectangular containers

ASE I/GED

Indicator A: Develops and applies number sense to solve a variety of real-life problems and to determine if the results are reasonable

1. Develops concepts, number sense, and number relationships relating to integers and rational numbers (e.g., whole numbers, decimals, fractions)
 - a. Estimates the square root of any whole number to the nearest whole number
 - b. Places integers in correct sequence
 - c. Adds, subtracts, multiplies, and divides positive and negative numbers
2. Demonstrates the relationships between the operations of addition, subtraction, multiplication, and division as they relate to integers
 - a. Explains the effect of addition, subtraction, multiplication, and division on positive and negative numbers
3. Selects and uses appropriate techniques while solving problems and determining the reasonableness of results
 - a. Represents and uses numbers with exponents
 - b. Uses computation, estimation, and proportions to solve word problems involving scientific notation
 - c. Uses computation, estimation, and proportions to solve word problems involving integers, exponents, and square roots

Indicator B: Applies data collection, data analysis, and probability to interpret, predict, and/or solve real-life problems

1. Constructs, reads, analyzes, and interprets tables, charts, and graphs
 - a. Chooses an appropriate graphic format to organize and represent data
 - b. Organizes collections of data into frequency charts, stem-and-leaf plots, scatter plots and matrices
2. Makes valid inferences and predictions based on statistical analysis
 - a. Formulates predictions from a given set of data and justifies predictions
 - b. Compares a given prediction with the results
 - c. Differentiates between a sampling and a census
3. Uses measures of mean, median, mode and range applied to a data set
 - a. Finds the mean, mode, range, median, and quartile of a data set
 - b. Applies the concepts of mean, mode, and median to draw conclusions about data
4. Determines probabilities through experiments and/or simulations and compares the results with prediction
 - a. Expresses probability as a fraction or percent

Indicator C: Applies algebraic concepts and methods to explore, analyze or solve real life

problems

1. Solves problems with formulas
 - a. Uses formulas on GED Math test (i.e., simple interest, distance, total cost) to solve word problems
2. Solves equations using addition, subtraction, multiplication, and division and checks by substituting the solution into the original equation
 - a. Solves a one-step equation and uses substitution to check answer
 - b. Solves a two-step equation and uses substitution to check answer
 - c. Analyzes and solves story problems involving one- and two-step equations
 - d. Solves ratio and proportion problems
 - e. Solves computations of cost, distance, and simple interest word problems
 - f. Determines slope of a line

Indicator D: Uses geometric properties, relationships, and methods to identify, analyze and solve real-life problems

1. Demonstrates an ability to recognize, define and apply geometric formulas and characteristics of rectangular coordinate planes, solid figures and linear measurements in solving problems
 - a. Applies the appropriate geometric formula (i.e., area, perimeter, volume, Pythagorean relationship, distance between two points in a plane) from the GED Math test for problem solving
 - b. Solves problems using similarity and proportion
 - c. Solves problems using alternate interior angles
 - d. Defines and graphs ordered pairs on rectangular coordinate plane

Indicator E: Applies knowledge of standard measurements to real-life situations

1. Describes and converts complex measurement units
 - a. Converts units of measurement into equivalent units of measurement using proportion (e.g., 3 feet: 1 yard; 18 feet: 6 yards)
 - b. Uses scientific notation to express units of measurement in large scales (e.g., distance of sun from earth = 93,678,912 miles = 93.678912×10^6)
 - c. Uses scientific notation to express units of measurement in small scales using negative exponents
 - d. Demonstrates change of placement in converting measurement units in the metric system (e.g., 353mm = 35.3cm, 2.5km = 25,000cm)

ASE II

Indicator A: Develops and applies number sense to solve a variety of real-life problems and to determine if the results are reasonable

1. Develops concepts, number sense, and number relationships relating to integers and rational numbers (e.g., whole numbers, decimals, fractions)
 - a. Explains the meaning of absolute value, e.g., $|-8| = 8$
 - b. Uses positive and negative exponents
2. Selects and uses appropriate techniques while solving problems and determining the reasonableness of results
3. Compares and contrasts the real number system and its various subsystems with regard to their structural characteristics
 - a. Classifies numbers as members of the sets (natural, whole, integers, rationals, and irrationals)
 - b. Compares subsets of the real number system with regard to their properties (commutative, associative, distributive, identity, inverse and closure properties)

Indicator B: Applies data collection, data analysis, and probability to interpret, predict, and/or solve real-life problems

1. Constructs, reads, analyzes, and interprets tables, charts, and graphs
 - a. Evaluates the reasonableness of conclusions drawn from interpretation of data in a graphic format
2. Constructs and draws inferences including measures of central tendency, from charts, tables, graphs and data plots that summarize data from real-world situations
 - a. Organizes collections of data into frequency charts, stem-and-leaf plots, scatter plots and matrices and determines outliers
 - b. Constructs histograms, line graphs, circle graphs and box-and-whisker plots
 - c. Uses mode, quartiles and range as a means for effective decision making in analyzing the data
3. Applies curve fitting to make predictions from data
 - a. Draws a line or a curve which closely fits a scatter plot
4. Explains the effects of sampling on statistical claims and recognizes misuses of statistics
 - a. Differentiates between a biased and an unbiased sample
 - b. Recognizes the impact of interpreting data from a biased sample
5. Determines probabilities through experiments and/or simulations and compares the results with prediction
 - a. Uses simulations to estimate probabilities of real-life situations
 - b. Designs a statistical experiment based on a given hypothesis
6. Describes, in general terms, the normal curve and uses its properties to answer questions about sets of data that are assumed to be normally distributed
 - a. Determines if data gathered from a real-world situation fit a normal curve
 - b. Describes the central tendency characteristics of the normal curve
 - c. Makes simple predictions from data represented on the graph

7. Explains the concept of a random variable

- a. Distinguishes situations where a random variable is needed or used
- b. Uses a random number table or technology to generate random numbers in modeling real-life situations (e.g., select randomly who belongs in what group)
- 8. Applies measures of central tendency, variability, and correlation
 - a. Draws conclusions about the “spread” of data given the variance and standard deviation (e.g., compare sets of data with the same central tendency but with different variance)
 - b. Determines, from a given plot of data, whether it has strong or weak, positive or negative correlation

Indicator C: Applies algebraic concepts and methods to explore, analyze or solve real life problems

- 1. Models real-world phenomena using functions and relations
 - a. Identifies the independent and dependent variables from a real-life situation
 - b. Expresses the relationship between two variables using a table, equation, graph, and matrix
 - c. Describes the relationship suggested by two or more graphs of related real-world situations
- 2. Interprets algebraic equations and inequalities geometrically and describes geometric relationships algebraically
 - a. Graphs a linear equation in two variables
 - b. Graphs a linear inequality in two variables
 - c. Determines slope and intercepts of a linear equation
 - d. Writes an equation of the line that passes through two given points
 - e. Determines from two linear equations whether the lines are parallel, are perpendicular or coincide
- 3. Applies trigonometry to real-life problem situations (e.g., investigates how to find the distance across the river using similar triangles and trigonometric ratios; compares the sine and cosine curves to the curves of sound waves and tide variations)
 - a. Uses the definitions of trigonometric functions to find the sine, cosine and tangent of the acute angles of a right triangle
 - b. Solves simple right-triangle trigonometric equations involving sine, cosine and tangent
 - c. Uses an appropriate right-triangle trigonometric model to solve a real-life problem
- 4. Performs mathematical operations on expressions and matrices, and solves equations and inequalities
 - a. Simplifies numerical expressions using the order of operations including exponents
 - b. Evaluates algebraic expressions using substitution
 - c. Simplifies square roots and cube roots with monomial radicands that are perfect squares or perfect cubes
 - d. Evaluates numerical and algebraic absolute value expressions
 - e. Multiplies and divides monomial expressions with integer exponents
 - f. Solves linear equations and inequalities in one variable
 - g. Solves quadratic equations
 - h. Solves radical equations involving one radical
 - i. Solves proportions which generate linear or quadratic equations
 - j. Solves absolute value equations containing a single absolute value expression
 - k. Solves systems of linear equations in two variables
- 5. Translates among tabular, symbolic and graphical representations of functions
 - a. Creates a linear equation from a table of values

- b. Creates a graph from a table of values
- c. Determines the solution to a system of inequalities in two variables, from a given graph (e.g., "Which of the shaded regions represents the solution to the system?")
- d. Determines the solution to a system of equations in two variables, from a given graph

Indicator D: Uses geometric properties, relationships, and methods to identify, analyze and solve real-life problems

1. Interprets and draws three-dimensional objects
 - a. Sketches prisms, pyramids, cones, and spheres
 - b. Classifies prisms, pyramids, cones, cylinders and spheres by base shape, lateral surface shape, related surface area and volume formulas
2. Represents problem situations with geometric models and applies properties of figures
 - a. Calculates surface areas and volumes of three-dimensional geometric figures given the required formulas
3. Deduces properties of figures using transformations in coordinate systems, identifying congruency and similarity
 - a. Determines whether a figure is symmetric with respect to a line or a point
 - b. Gives the new coordinates of a transformed geometric figure
 - c. Determines the effects of a transformation on linear and area measurements of the original figure
 - d. Sketches the figure that is the result of a given transformation
4. Deduces properties of and relationships between figures from given assumptions
 - a. Finds similarities and differences among geometric shapes and designs using a given attribute (e.g., height, area, perimeter, diagonals, angle measurements)
 - b. Identifies arcs, chords, tangents and secants of a circle
 - c. States valid conclusions using informal deductive reasoning
5. Translates between synthetic and coordinate representations (e.g., a straight line is represented by the algebraic equation $Ax + By = C$)
 - a. Verifies characteristics of a given geometric figure using coordinate formulas such as distance, mid-point, and slope to confirm parallelism, perpendicularity, and congruency
6. Recognizes and analyzes Euclidean transformations (e.g., reflections, rotations, dilations and translations)
 - a. Classifies transformations based on whether they produce congruent or similar non-congruent figures
 - b. Determines whether a given pair of figures on a coordinate plane represents a translation, reflection, rotation and/or dilation
 - c. Applies transformational principles to practical situations (e.g., enlarge a photograph)

Indicator E: Uses both inductive and deductive reasoning in making conjectures and testing the validity of arguments

1. Uses inductive and deductive logic to construct simple valid arguments
 - a. Constructs a simple informal deductive proof (e.g., write a proof of the statement: "You can fly from Bombay to Mexico City, given an airline schedule")
 - b. Produces a valid conjecture using inductive reasoning by generalizing from a pattern of observations (e.g., if $10^1 = 10$, $10^2 = 100$, $10^3 = 1000$, make a conjecture)
2. Determines the validity of arguments
 - a. Determines if the converse of a given statement is true or false
 - b. Draws a simple valid conclusion from a given if ... then statement and a minor premise
 - c. Lists related if...then statements in logical order
 - d. Distinguishes valid arguments from invalid arguments
 - e. Analyzes assertions about everyday life by using principles of logic (e.g., examine the fallacies of advertising)
 - f. Uses Venn diagrams to determine the validity of an argument
 - g. Recognizes the difference between a statement verified by mathematical proof (i.e., a theorem) and one verified by empirical data (e.g., women score higher than men on vocabulary tests)
3. Formulates counterexamples and uses indirect proof
4. Develops and analyzes algorithms
 - a. Constructs a counterexample to show that a given invalid conjecture is false (e.g., Nina makes a conjecture that $x' > x$ for all values of x . Find a counterexample.)
 - b. Writes an algorithm that explains a particular mathematical process (e.g., tell a younger child how to find the average of two numbers)
 - c. Determines the purpose of a given algorithm
 - d. Determines whether given algorithms are equivalent